

developer. With properly prepared copy, it is never necessary to use this method for line drawing or stippled work.

Half-tone.—This method is almost universally used for the reproduction of photographs of landscapes, models, and portraits. It is also used for photomicrographs. With properly prepared copy it is very satisfactory; but it must be remembered that the screen used by the engraver makes black lines through every white portion, and white lines through every black portion, thus reducing the contrast. Consequently, if the copy is only a fine artistic photograph, the reproduction will be flat and lifeless. In making the negative, use a contrasty plate, develop with a contrasty developer, print on a glossy paper, and squeegee the print. Contrast should be so over-emphasized in the copy that the reproduction, rather than the copy itself, shall represent what the author desires. If the figure is to appear as a text cut, $4\frac{1}{8}$ inches in width, it will be much more satisfactory to use a 5×7 copy than a $3\frac{1}{4} \times 4\frac{1}{4}$. An enlargement of the copy by this method, or by any other, is wholly unsatisfactory.

THE STRUCTURE OF THE SPIKELET OF APHANELYTRUM

(WITH ONE FIGURE)

In ENGLER and PRANTL'S *Pflanzenfamilien*¹ HACKEL proposes *Aphanelytrum* as a subgenus of *Brachyelytrum*. He bases the subgenus on a single species from Ecuador, *Brachyelytrum procumbens* Hack., differentiating it from *Eubrachyelytrum* by its glumes, minute, "often wanting," and by its thinner, shorter-awned lemmas. The grass was first listed, without description, as *Aphanelytrum procumbens* Hack. in SODIRO'S enumeration,² based on HACKEL'S identification of his collections of the grasses of Ecuador. Later HACKEL described³ the plant as a new genus, discussed its relationship and the structure of its inflorescence, and gave a figure of the supposed spike with three spikelets.

In 1914, among South American grasses received for identification from the Royal Botanical Garden at Petrograd was a specimen collected by JAMESON (no. 168) in Ecuador, which proved to be referable to *Aphanelytrum*. The peculiar spike of three sessile spikelets, the upper two with glumes obsolete, described by HACKEL, is found to be a single 3-flowered spikelet with very long rachilla joints. In the generic description HACKEL says that the 1-flowered, distichous spikelets are alternate and subterminal along the branches of the subsimple panicle,

¹ Nachträge 2:42. 1897.

² Ann. Univ. Quito Ser. 3:480. 1889.

³ Oesterr. Bot. Zeitschr. 52:12. 1902.

the primary branches bearing 3, the secondary 2 or 1 spikelets, the lateral ones sessile, the branchlet with its spikelets forming 2-3-merous

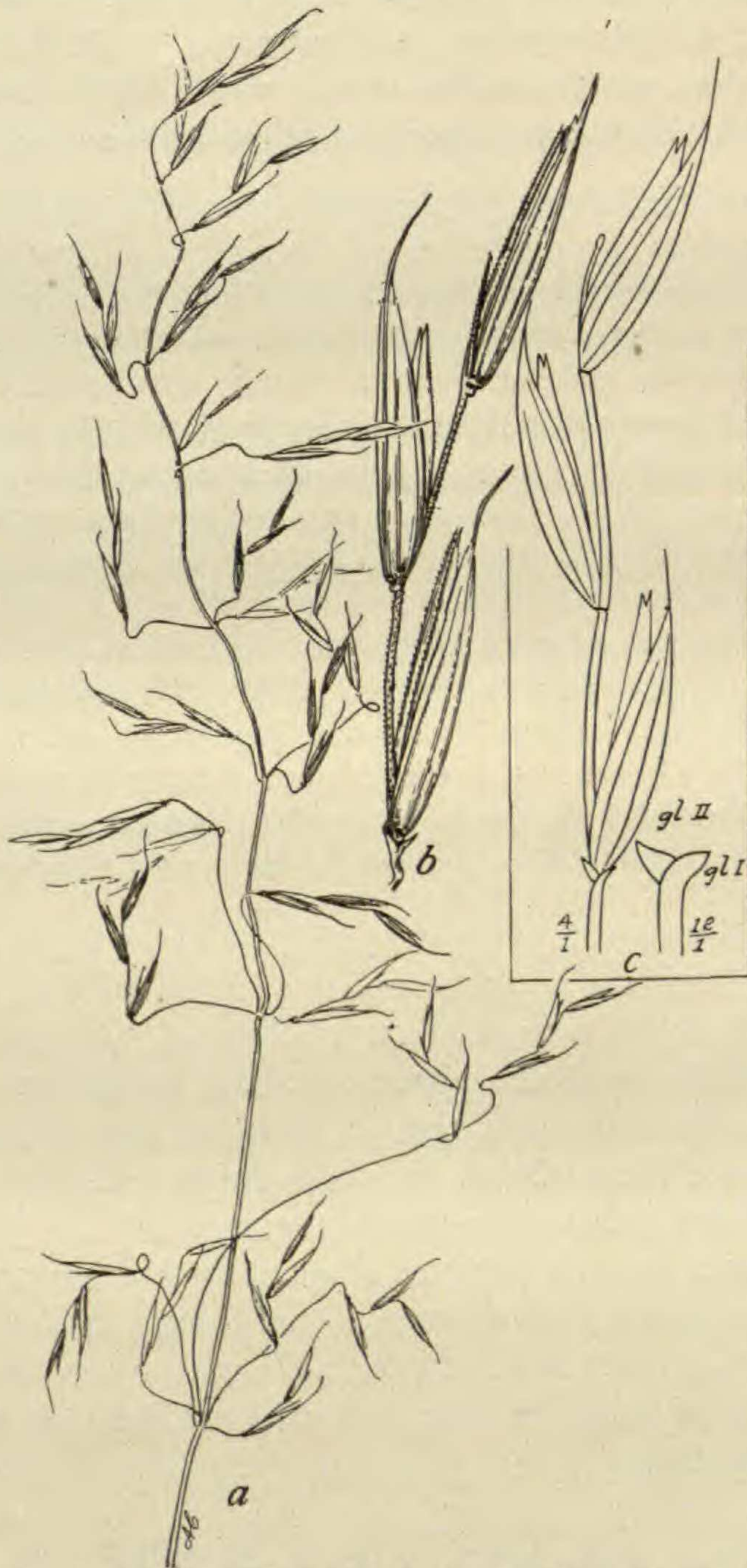


FIG. 1.—*Aphanelytrum procumbens* Hack.: *a*, panicle, nat. size; *b*, spikelet, $\times 4$; *c*, copy of HACKEL'S figure.

spikes, of which the axis, articulate above the sterile glumes of the individual spikelets, is produced into a pedicel beyond the uppermost spikelet; that the two glumes are very minute or in the upper spikelets wholly

obsolete, the upper glume (of the lowest spikelet) lying outside of the internode of the axis, both glumes persistent.

In the discussion following the description, HACKEL states that while he had regarded *Aphanelytrum* as a subgenus of *Brachyelytrum* only, further study had convinced him that it was a valid genus. He lays particular emphasis upon the character of the inflorescence:

The primary branch bears, as it appears constantly, 3 sessile lateral spikelets, the axis extended as a stipelet beyond the uppermost, thus forming a spike, but of so remarkable a structure that I know of no second example among the grasses. Of the two very small glumes which can always be found distinct only on the lowermost spikelet, those of the two upper mostly being wholly aborted, only the lower is found on the same side of the spike axis as the spikelet, the upper being found on the opposite side of the axis. This position is contrary to the conception of this spike as a monopodium, as the spike of the *Hordeae*, etc., doubtless is; one must rather assume the axis of the spikelet to be the continuation of the spike axis internode below it, and the internode next above to represent a branch in the same direction as that below put forth from the axil of the second glume, the whole spike, then, forming a sympodium. Whether this admits of another explanation later study of more material will decide, but the facts of the case, as the accompanying figure shows, are without doubt. As to the upper members of the spike these can only be understood from analogy to the lower, since in these the glumes are wanting or reduced to minute vestiges.

When this structure is recognized as a single spikelet, the necessity for assuming it to be a sympodium is obviated; the position of the second glume is seen to be the normal one; and, except for the elongated rachilla joints, the spikelet is seen to be in no way anomalous. The minute vestiges of glumes below the upper florets referred to by HACKEL must be the rather prominent callus of the floret.

Among plants recently received from Colombia were several specimens of *Aphanelytrum procumbens* collected along a trail at 3100 meters by Fratres APOLLINAIRE and ARTHUR (no. 717). From these specimens the accompanying figure and the following emendation of the generic description are drawn.

APHANELYTRUM Hack. emended

Inflorescence a few-flowered panicle, the remote capillary, flexuous, simple or subsimple branches in fascicles of 2-4 or the upper solitary; spikelets on slender flexuous pedicels, perfect, 2 or 3-flowered, articulate above the minute glumes; rachilla joints capillary, flexuous, from half

to three-fourths as long as the erect or spreading florets, prolonged beyond the uppermost floret; stamens 3.

A specimen of this collection was sent to HACKEL, together with notes on the structure of the spikelet. In reply he writes: "It agrees exactly with the type. . . . After careful weighing of the evidence I must agree that this explanation is more satisfactory than the one proposed by me, especially because thereby the position of the glumes becomes entirely natural and comprehensible."

The 3-flowered spikelets place this genus in the tribe Festuceae, but where it should be placed in that tribe I am not prepared to say; it is not closely related to any other known genus. In the National Herbarium it is placed for the present between subtribe Meliceae and subtribe Centotheceae. The name *Aphanelytrum*, referring doubtless to invisible glumes, is not so inept, fortunately, since the glumes are very small.—
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